

INTRODUCING AUTO FLOW OF INFORMATION IN ESTABLISHING SUSTAINABLE ARMIS IN BANGLADESH

HASAN MD. HAMIDUR RAHMAN¹ & MD. ABEED HOSSAIN CHOWDHURY²

¹Senior System Analyst, Computer and GIS Unit Bangladesh Agricultural Research Council, Bangladesh

²Director, Computer and GIS Unit Bangladesh Agricultural Research Council, Bangladesh

ABSTRACT

Online Agricultural Research Management Information System (ARMIS), developed earlier for managing information of agricultural research projects/programs/experiments was entirely managed by the hired/recruited personnel under project based financial support. Considering the importance of such system for planning and conducting of agricultural research in the context of higher agricultural productivity, it was deemed necessary to develop a sustainable ARMIS application which can be operated under the present structure of research institutions. Thus, the idea of introducing auto flow of information in developing sustainable ARMIS is conceived. The auto flow of information is devised in such a way that the information will be managed within the institution's own mechanism, thereby no external support is required in the form of financial and/or hired personnel. In the latest version of ARMIS, the activity performed at different user's level such as entry, checking, verification, submission and final approval of research information needed to be included into the system is accommodated under auto flow information mechanism. The mechanism is well supported by a standard notification system, where the relevant users involved in the process are informed by auto message/ email containing the action taken by the respective users. In addition, the new version of ARMIS will ensure data integrity, authenticity, availability etc. and establish ownership of data by the concerned organization which is very essential for the sustainability of any system. The online ARMIS is linked to the website of the Bangladesh Agricultural Research Council (BARC) which is accessible by any users. Besides research planner, ARMIS information is useful especially for the researchers/academics planning to setup new research or want to know the status of existing research in a particular area of interest or of discipline.

KEYWORDS: ARMIS, Agricultural Research, Auto Flow Information, Online Database & Sustainable Database Application

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INTRODUCTION

The online Agricultural Research Management Information System (ARMIS) application has been developed by Computer and GIS unit of Bangladesh Agricultural Research Council (BARC) for managing information on agricultural research projects/programs/experiments of Bangladesh. BARC started the ARMIS project in July 2013 with the aim of creating a facility to view agricultural research information by researchers, educationists, research managers, policy makers and other users from a single source (Rahman & Chowdhury, 2016). At the same time, another important goal was to avoid wasteful duplication while undertaking research project by the National Agricultural Research System (NARS) institutes and other organizations. Most of the research information stored into the ARMIS database was inputted by 13 NARS organizations and agricultural universities. In addition, agricultural research information from NGOs and other related organizations are also

stored into the online database. The research information entered into the ARMIS directly by the designated persons of respective research organizations under project support and by the project personnel who collected information from the relevant stakeholder organizations. And, the information as entered was checked and edited by the agriculture experts of the project before final publishing to the online ARMIS application. However, it was anticipated that the existing mechanism of entering research information into the ARMIS cannot be continued after the withdrawal of project support. This lead to devising a mechanism to determine how the flow of information be continued in a sustainable manner considering the importance of this application. Consequently, the idea of an auto flow of information in establishing sustainable ARMIS is developed. Thus, in the recent version of the online ARMIS application, checking/editing of research information for which expert support is needed has been institutionalized and notification system is devised as part of an auto flow of information as well as approval process which is required for inclusion of research information into the database is automated. The notification system considered very vital for taking action by the respective users at different levels from entry of research information to approve the same for inclusion in the database. Currently, notification through the system dashboard and through email is active. In this new system, the research information will be inputted by the primary users of respective disciplines of the stakeholder organizations which need to be approved/cleared by the concerned authority designated by their own organizations before being added into the database. Accordingly, to support the entire process of information flow at a different user's level the notification system through email is introduced and it is going to be managed by the respective organizations. For this, a series of hands on training were organized for different level of users at each institution to accustom with the new system specifically on the auto flow information mechanism which will facilitate the institutionalization of ARMIS. The new version of ARMIS application was developed to ensure both data integrity and ownership of data by respective organizations which are very important for the sustainability of ARMIS application.

Approach and Methodology

The core of the 2nd version of ARMIS lies in introducing (a) auto flow information mechanism throughout different layers of information handling process (b) notification system for different categories of users for every action linked to entry/submission of research information and (c) modified design of ARMIS application meant for incorporating those two along with many other important features described under the following sections.

Auto Flow Information Mechanism

In the web based online ARMIS application, when research information inputted by a User of an organization, it automatically goes to next level, i.e. Internal Reviewer (IR) for cross checking of submitted information as part of the internal verification mechanism. While cross checking if the information is found okay, it will move to the next level i.e. External Reviewer after submission by the Internal Reviewer. Once it is cleared by the External Reviewer i.e. if he approves the research information as correct one only then it is added into the ARMIS application permanently. In case of incorrectness, it is sent back to the Internal Reviewer with relevant comments for necessary correction/alteration. Likewise Internal Reviewer can send it back to the User with comments if deemed necessary, who submitted the research information initially, or resubmit it to External Reviewer after making necessary correction/ put down the proper reasoning for the appropriateness of previously submitted information. If the research information entered into the system is sent back to the User, the same procedure needs to be followed for resubmission of that research entry. The entire procedure as described consists of research entry, checking, verification, comments and submission/resubmission. These are part of the

auto flow mechanism which is supported by notification system that is generating auto message in the dashboard and email at different level of users informing them status of action taken by the respective users. Once the research information is added/ published in the web based online ARMIS application, the content cannot be modified by the respective organizations.

It is pertinent to mention that, Internal Reviewer is chosen from the head of respective disciplines of an organization whereas External Reviewer is chosen centrally for specific research program area and/or discipline. Senior scientists from respective organizations or other organizations can also be an External Reviewer of that organization.

The pictorial view of auto information flow mechanism used in ARMIS can be shown in the following diagram.

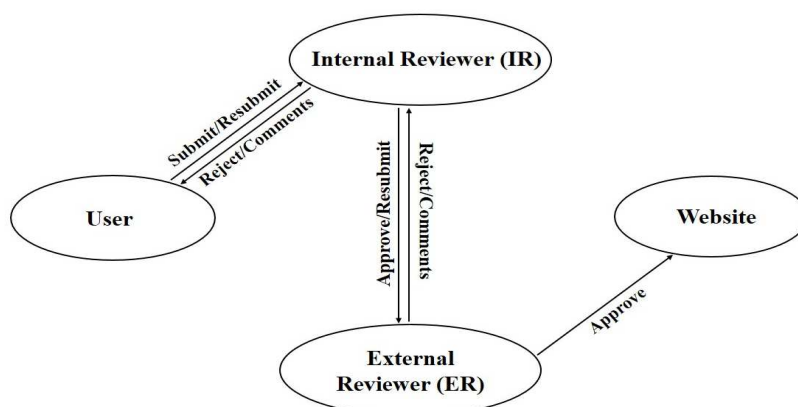


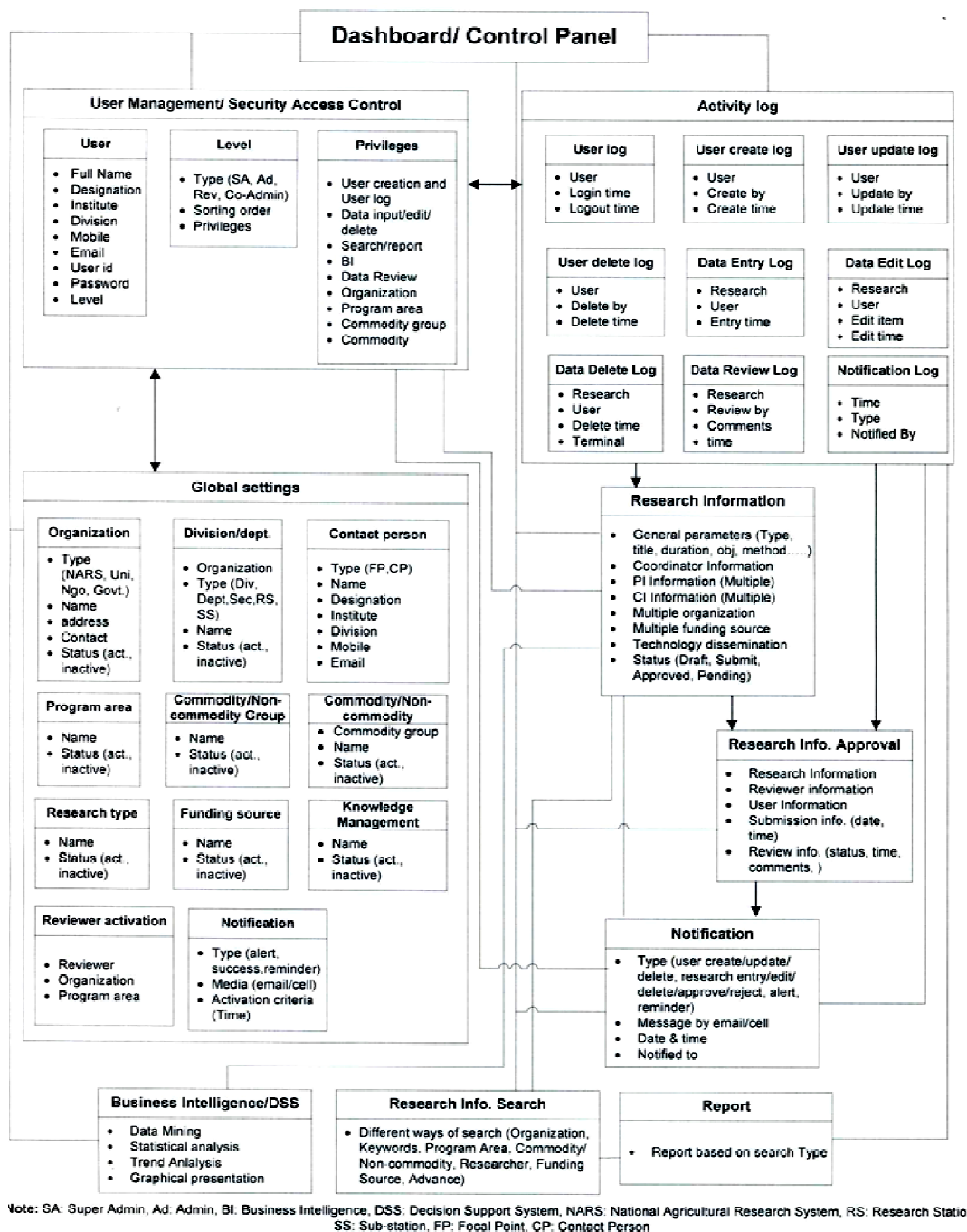
Figure 1: Research Entry Review Process

Notification System

The notification system is introduced as part of smooth functioning of auto flow information mechanisms with an aim to facilitate the continual accumulation of data into the ARMIS database system. There are three types/categories of internal users associated with the data accumulation process of online ARMIS application, namely User, Internal Reviewer and External Reviewer as mentioned earlier. To make the whole process vibrant and throughout the whole journey of information submission to approval process, auto notification system is introduced. Email and mobile based SMS notification is considered to cater the need and initially email notification system is activated. An email is forwarded to the respective User/Internal Reviewer/External Reviewer as soon as an event occurs related to submission of any research information. The entire process starting from a research entry by a user subsequently to internal reviewer then external reviewer and back and forth is supported by auto notification system.

Updated Design of ARMIS

The 2nd version of ARMIS application is designed to incorporate all the features described above, namely auto flow of information, notification to different levels of users etc. However, some useful features like dynamic reports, business intelligence, saving of research information as draft, activity log report of the internal users, keeping log on data accessibility by the external users etc. are also added in this version. Again the security of data access is ensured through incorporating three layers of users with specific privilege hierarchy as described earlier. These have made the application more user friendly, more effective and more secured one. The conceptual diagram of the updated version of ARMIS can be shown as below:

Figure 2: Conceptual Diagram of 2nd version of ARMIS

RESULTS AND DISCUSSIONS

The ARMIS database has been developed with active support from the technical staff hired under the project. However, to make the ARMIS sustainable auto flow information mechanism is introduced so that it would be easier for the data generating organization to operate and maintain the system without external support. Accordingly, a series of hands on training were organized on the newly introduced procedure, i.e. auto flow information mechanism for the stakeholder organizations. At present, about 26,500 (Twenty six Thousand and Five Hundred) research information have already been accumulated in the ARMIS database. The information were collated from more than 150 organizations including NARS

institutes, public/private universities, government and non-government organizations, international organizations etc. and from more than 102 online and offline journals. It is to be mentioned that agricultural research conducted only in Bangladesh is considered for entry into the database. The researchers, academics, educationists, policy makers can search the database in an effective way according to their specific need. The 24x7 seamless accesses to the database is possible through any smart device, desktop, laptop etc. from anywhere of the globe.

CONCLUSIONS

It is evident that the online ARMIS database application will help to manage information on research projects/programs in a single location. Accordingly, the research manager/administrator, academics, researchers, or other users will be able to view and search information related to agricultural research in Bangladesh. In addition, the users of ARMIS will be able to generate report based on their search/query. The unique nature of ARMIS ensures information and data availability to those within and beyond the institution's boundaries in-time and in the proper manner. The system will provide opportunities for reviewing and sharing of research information and help avoid wasteful duplication of research projects/programs. Research trend analysis is available in the application which is very important for the decision maker to decide upon which area/sector of agriculture the government should give research thrust. It will facilitate services for the researchers to find and manage information efficiently and effectively in their learning, reviewing and formulating of new research. Also, the system will allow online input of information on research projects/programs by the stakeholders engaged in agricultural research. The auto flow information mechanism as introduced will be helpful for efficient operation of the system, thereby establishing sustainable ARMIS in Bangladesh.

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